

# The Physical Conditions of the Lupus Molecular Clouds

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The Lupus Molecular Cloud complex is one of the closest star-forming regions to us, about 150 pc away in the Gould Belt. Analysing new observational data obtained with the Tidbinbilla 70m radio telescope, we present the first emission maps of the ammonia inversion transition lines (1,1 and 2,2) in Lupus I and III regions.

**The lupus molecular clouds** Clouds of molecular gas in the interstellar medium play a vital role in the evolution of matter in our Galaxy - they are the birthplaces of new generations of stars and planets. Understanding their physical conditions and chemical evolution within the Milky Way is crucial to our overall knowledge of the evolution of galaxies.

Lupus Molecular cloud complex, approximately 150 pc away and located in the Gould belt, is one of the closest star-forming regions to us. The Lupus molecular clouds faces across the Upper-Sco subgroup of the Sco-Cen OB association, and show thermal and dynamical effects from nearby massive stars (this is particularly apparent in the morphology of the Lupus I ridge, e.g. Tachihara et al 2001, Tothill et al 2009). Presented in this poster are early results of project T199, covering Lupus regions I, and III.

**Observations with the Tidbinbilla radio telescope** Canberra Deep Space Communication Complex (CDSCC) is located in Tidbinbilla and is owned by NASA and operated by CSIRO, it is used by NASA to track spacecrafts. Under the Host Country agreement with NASA, a fraction of antenna time that is not used for spacecraft tracking is available for the astronomical community. DSS43 is a 70m radio antenna and the largest in the Southern Hemisphere. Tidbinbilla currently lacks a dedicated on-the-fly mapping mode, which allows much more efficient mapping of large areas. We have taken the first steps towards implementation of an on- the-fly mode.

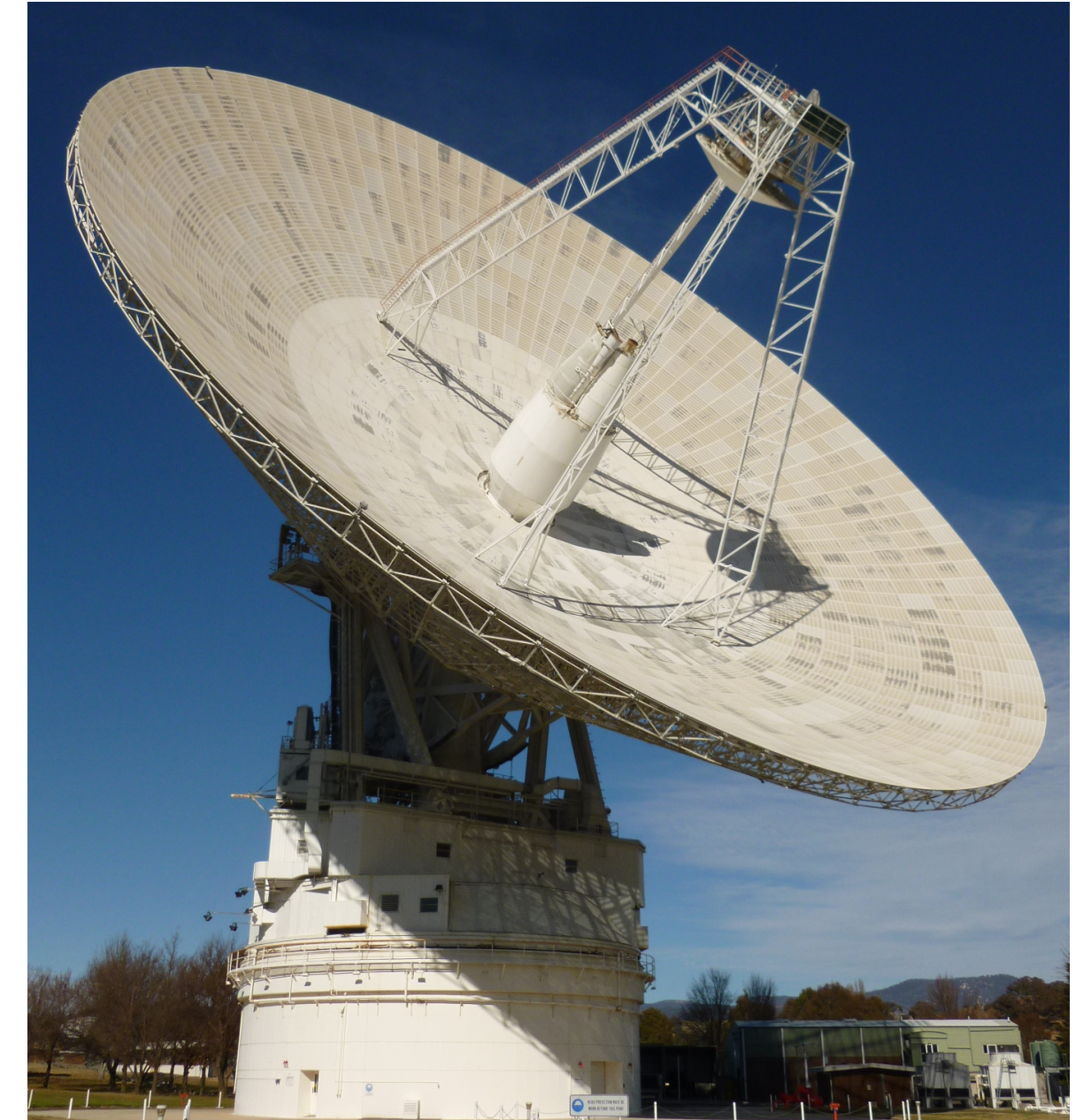


Figure 1: DSS43, Tidbinbilla 70m Radio Telescope

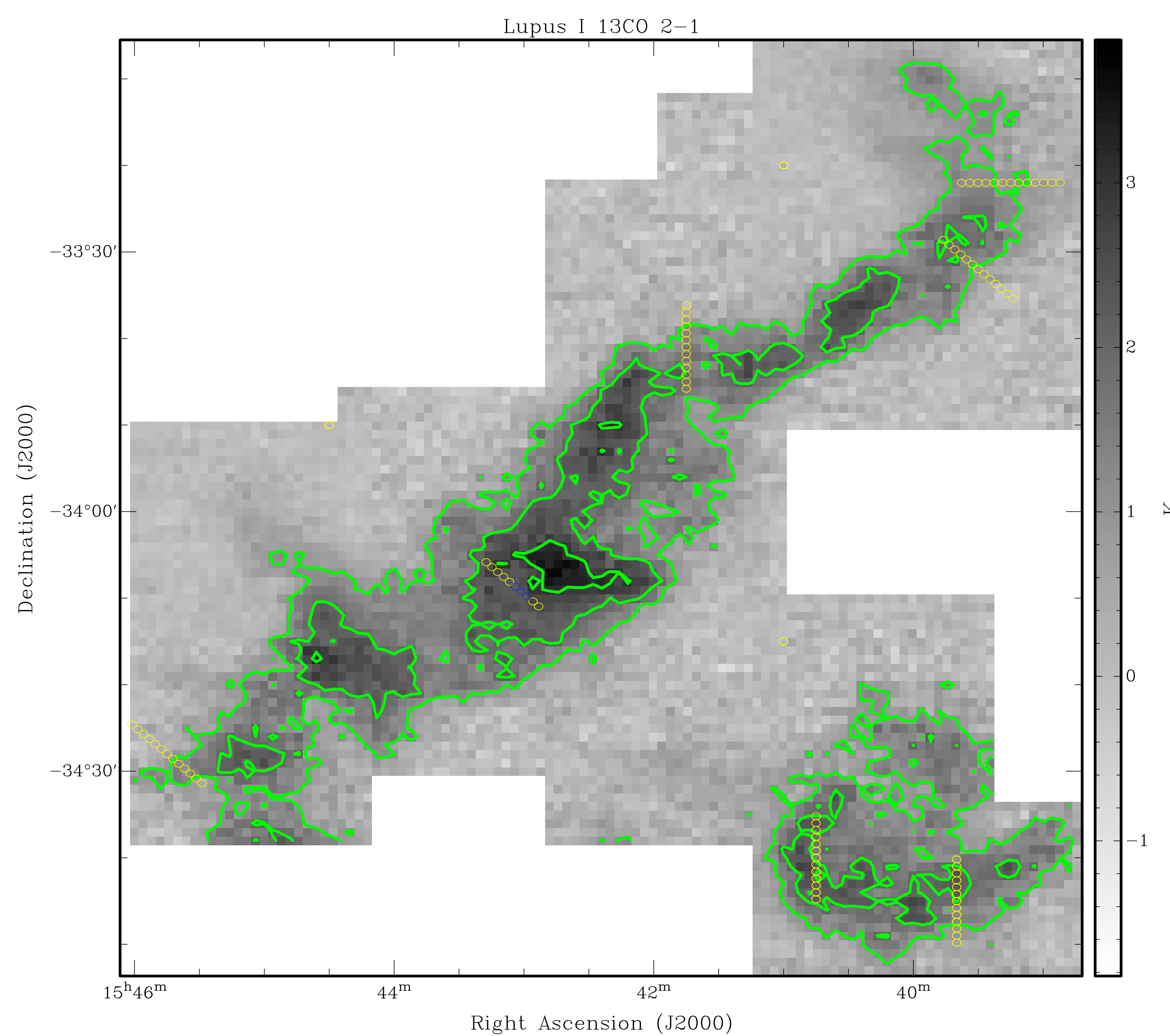


Figure 2: 13CO 2-1 integrated intensity toward Lupus I (Tothill et al 2009), overlaid with T199 observations (in yellow & red). The red circles denote the beam positions whose spectra are shown in Figs 2a & 2b

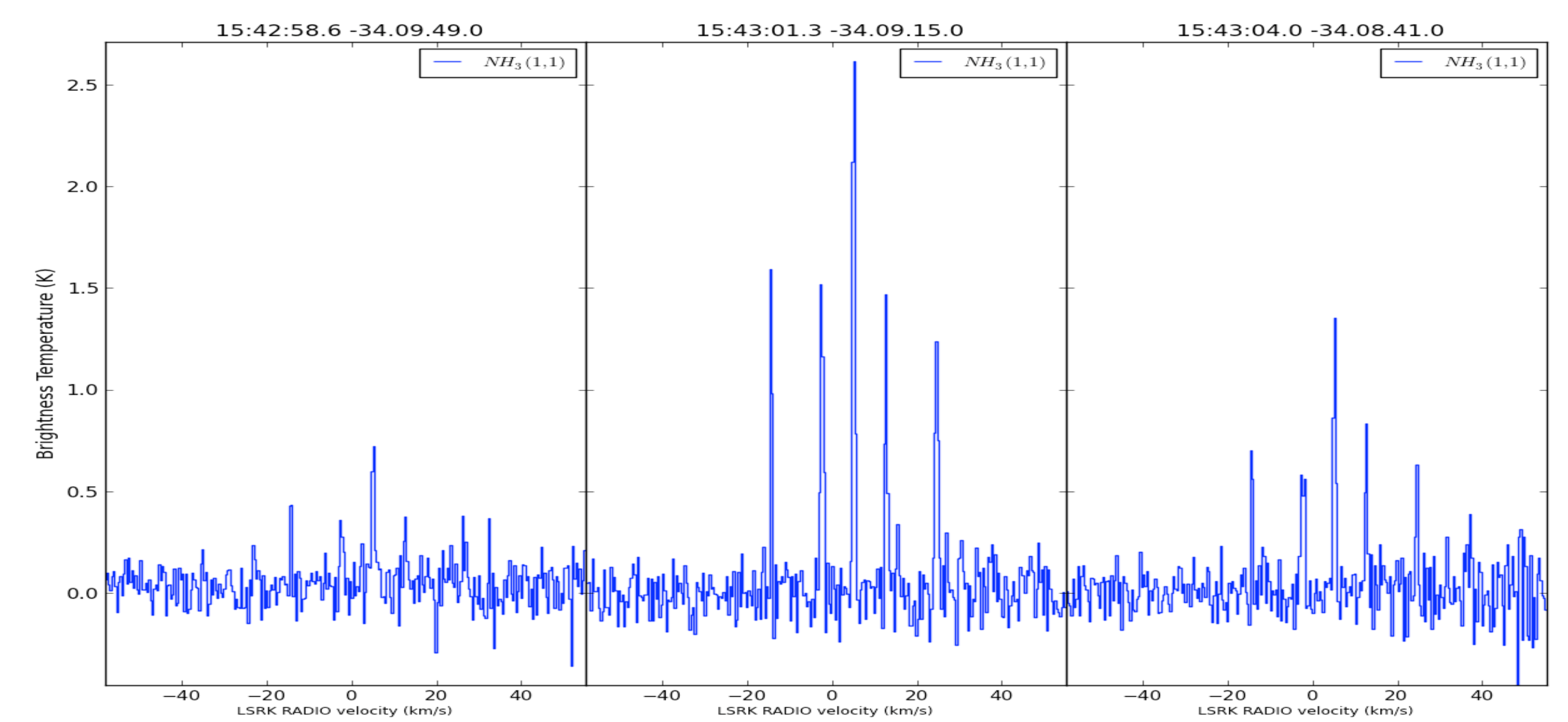


Figure 2a: T199 results: NH3(1,1) spectra towards 3 positions across the Lupus I ridge (blue circles), with all 5 hyperfine components detected.

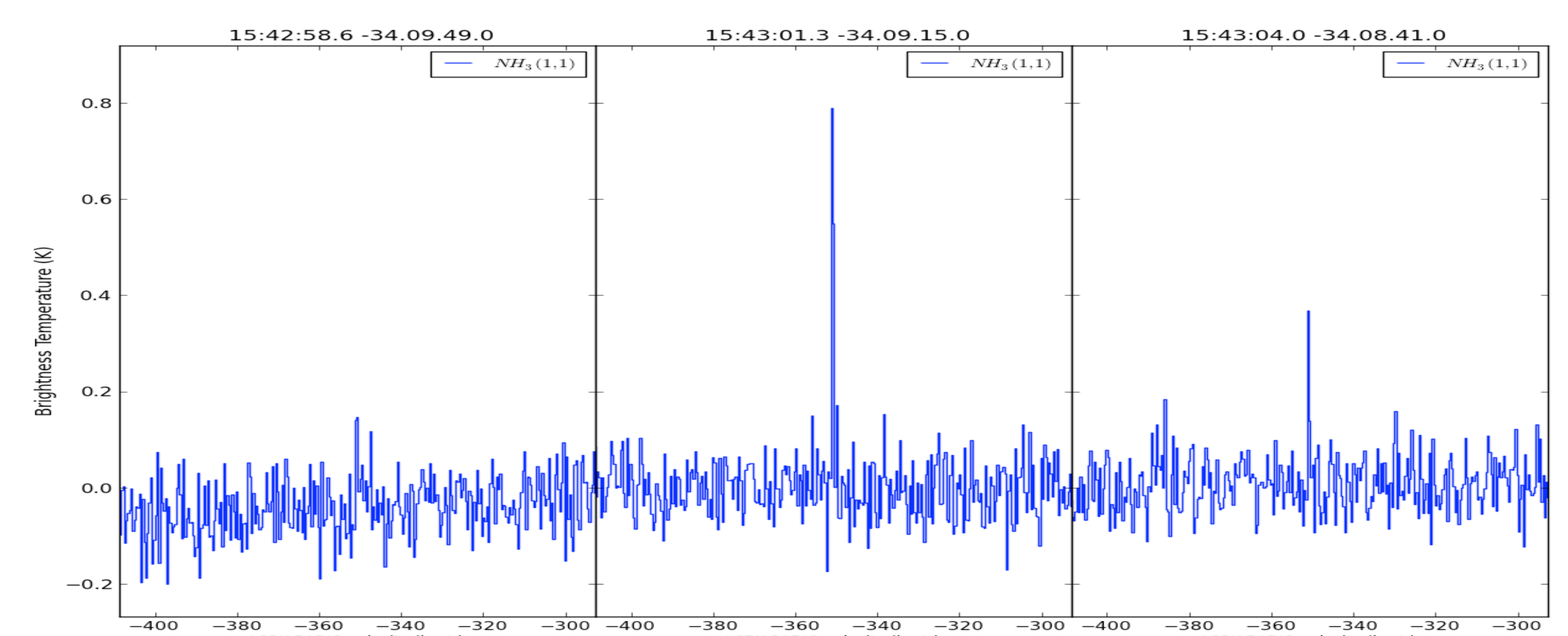


Figure 2b: T199 results: NH3(2,2) spectra towards the same 3 positions as Fig. 2a, across the Lupus I ridge (blue circles)

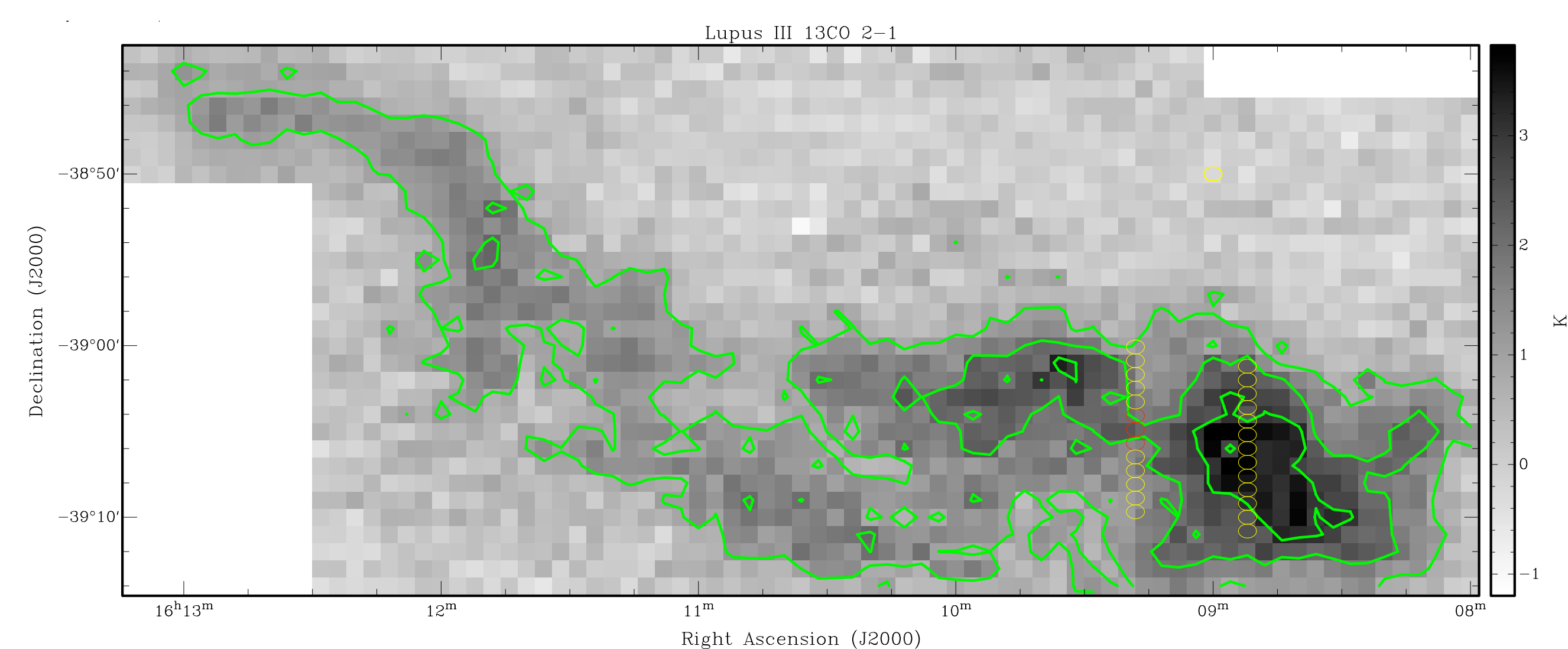


Figure 3: 13CO 2-1 integrated intensity toward Lupus III (Tothill et al 2009), overlaid with T199 observations (in yellow & red). The red circles denote the beam positions whose spectra are shown in Figs 3a

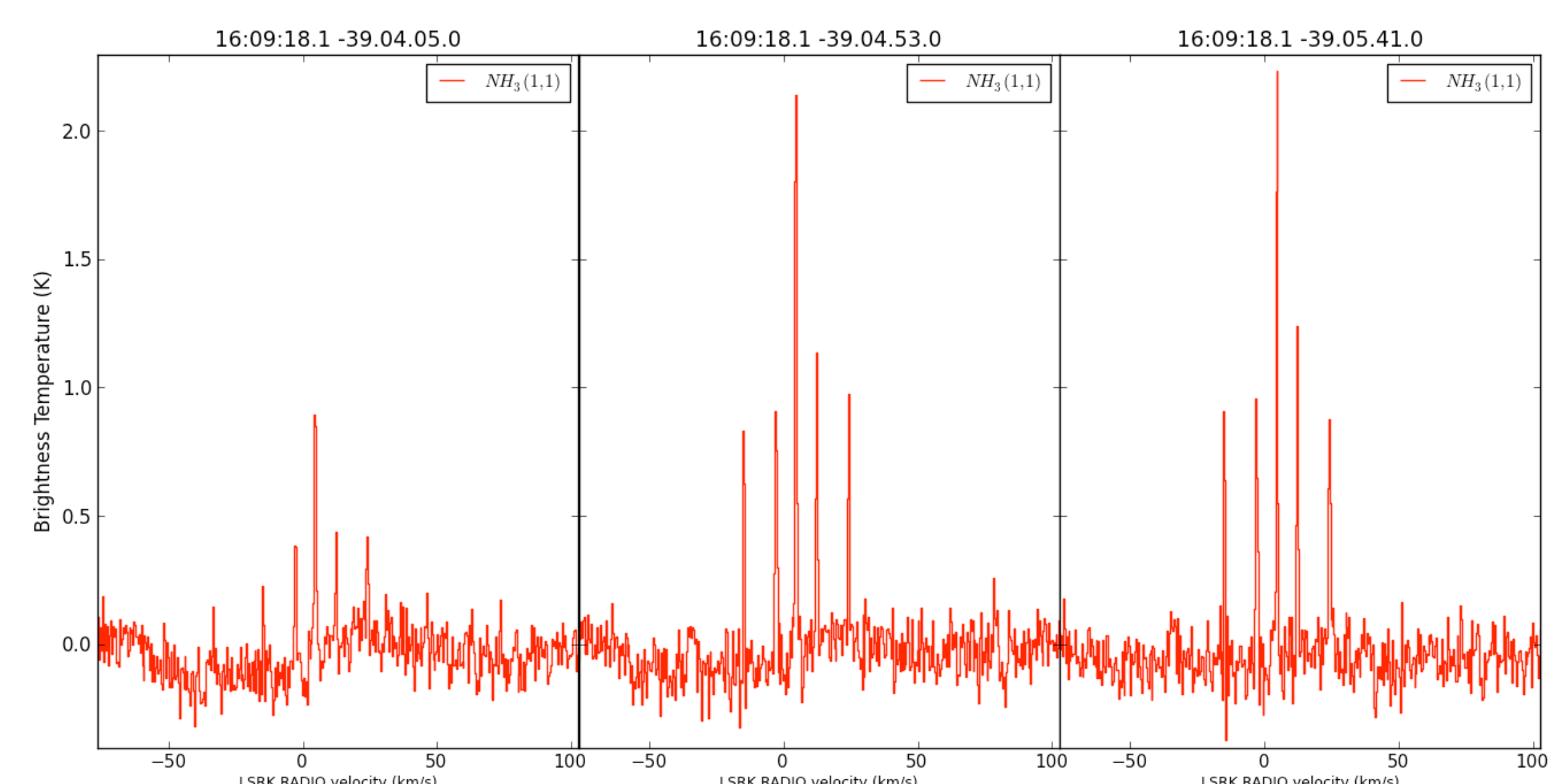


Figure 3a: T199 results: NH3(1,1) spectra towards 3 positions across the Lupus III (red circles), with all 5 hyperfine components detected.

## FOR FURTHER INFORMATION

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## REFERENCES

Tachihara et al. 2001, PASJ, 53, 1081

Tothill et al. 2009, ApJS 185, 98